

September are months of harvesting and thrashing, followed by the preparation of the soil for fall-wheat sowing and the beginning of sowing. October is devoted to the completion of fall work in the field, and November and December to germination, a considerable growth sometimes being obtained ere the end of the quarter, for use as winter pasture. Upon the precipitation during the first quarter of the calendar year, and especially in February or March, depends to a great extent the prospects of the wheat crop; this might, perhaps, be termed the rooting season, for growth to the jointing stage is not permitted for fear of destruction by frost; spring-grain sowing is well advanced by the end of March. The wettest quarter of the year is April, May, and June, which constitute the growing season for all small grains, and the end of June usually witnesses the maturity of winter wheat and the close approach of the end of the oat and barley season.

Since irrigation water is not available in this section, and since no dependence can be placed upon the weather in July and August, which months are often dry and always hot in the daytime, the farmer relies principally upon produce that develops beyond danger early in the summer. It is necessary, however, to have fodder and hay with which to supplement buffalo grass pasturage in case of severe storms or scarcity of grass, and it is, therefore, customary to plant considerable corn, cane, and Kafir corn. Corn is planted, not with the expectation of securing a grain crop, though the profits from an occasional favorable season are perfectly acceptable, but for the more certain returns from its fodder. The most important hay crop in this region is alfalfa, to which all available bottom land is sowed, and from which three or four crops of hay are secured each season.

These remarks apply to southwestern Kansas, where the climate is different in many respects from that in other portions of the State. The much greater rainfall in the middle and eastern sections of the State permits the raising of immense corn crops in the most favorable seasons, and good crops in average seasons, as also numerous other agricultural products that can not be successfully grown in the western portion of the State.

DETAILED CLOUD OBSERVATIONS IN COLORADO.¹

By J. B. WILLSEA, Voluntary Observer, Fruita, Mesa County, Colo., dated February 10, 1904.

For a dozen years past almost all the relaxation I have enjoyed has been in studying the clouds, but without the aid of teachers, books, or instruments. This is my only excuse for writing you. One of your assistants may find a kernel of grain in the chaff I present and be able to use it in his own special line. I never saw any of the facts mentioned below in print, nor heard them from others.

The top of a fleecy cloud leans in the direction it is traveling, because the top travels faster than the bottom, it being less affected by the friction of the air against the earth's surface.

The sun's rays sometimes seen in the east at about sunset, converging at a point diametrically opposite the sun, are parallel, and are lights and shadows of clouds in the whole sky and of mountain peaks and ridges, in this locality, projected through the atmosphere to its outermost visible limits, but the rarity of the upper air and its freedom from color prevent apparent focusing of the rays in the east.

The motion of a cloud in a vertical direction is sometimes quite rapid, for I have watched a fleecy cloud rise from the hillside and within an hour become a high cirro-cumulus.

When a rain cloud is rapidly rising, the under side is frequently covered with small, curling masses of vapor, especially

in showery weather, resembling in shape the swirls or boiling of the water in the wake of a steamer. Of course this indicates a rising barometer, but I have no means of determining whether a cloud is approaching the earth or not, save by its increasing density.

I have never seen a cumulus cloud increase in size at the bottom; the increase was always at the top. Cumulus clouds sometimes rise to an immense height, cirro-cumulus appearing far below them.

The reflection of a cloud in a still lake appears larger than the original cloud.

In looking at a colored sunset, if the head is inclined so far to one side that the eyes are upside down, the colors appear much more brilliant.

The appearance of the clouds at a distance, where by reason of the curvature of the earth they touch the horizon, proves the sphericity of the globe. Otherwise the clouds would appear smaller and smaller until they became telescopic; but they do not.

The sphericity of the earth is shown by the sunset tints lingering much longer in the northern part of the horizon in the summer and in the southern part of the horizon in the winter than would be the case if the shape of the earth were not spherical. We can see the longer day to the north of us at sunset in summer and the same to the south of us in winter. I do not refer to the clouds, but to the tints of the clear sky, visible to a great distance.

At morning and at night at certain seasons of the year, there is seen apparently a portion of a cloud hanging down from the main cloud something like a beard, and resembling rain, but not having the even, clear, direct lines of descending rain seen at a distance. It puzzled me for years, but on seeing the phenomenon with tall cliffs as a background, I saw that the precipitation left the cloud as snow, but was melted to rain long before it touched the earth, perhaps even evaporating before reaching the ground. This occurs when much of the sky is clear and with isolated clouds mostly, where the clear sky furnishes a good background for observation.

I find that the thermometer shelter used by the cotton-belt observers has one fault; the rain fills the horizontal crack at the top of the door, and at night time the door freezes fast to the casing, so that damage is done in opening it. I have had no further trouble since I bevelled off the top of the door a little, thus allowing the rain to flow away.

MIDWINTER WEATHER CONDITIONS IN WESTERN ONTARIO.

By A. G. SEYFERT, Stratford, Ontario, dated January 26, 1904.

Not within the memory of the oldest inhabitant has western Ontario experienced such an unprecedentedly severe winter as this. Instead of the usual autumn rainfall, fine weather prevailed up to the middle of November, when it turned cold and commenced to snow, and has continued almost incessantly to the present time. Four feet of snow on the level and drifts in many places four times that depth result. Country roads are blockaded, and communication almost entirely cut off. Railroads are in but little better condition. The main lines are kept open, but many of the branches are completely snowed under and abandoned for the present. Every effort is being put forth in fighting the elements to keep the roads open, but never did such conditions prevail since railroads were first built in this province. The high winds, the intense cold, and the enormous quantity of snow are more than human agencies can overcome. The local papers are full of details of all sorts of accidents and fatalities attributable to the weather conditions. Roofs breaking down from the weight of the snow, people frozen to death within sight of their homes, freight trains loaded with live stock in snow drifts until the strongest

¹Although many of these observations are not new to meteorology, yet the whole article is in the right direction, and we can only hope that Mr. Willsea may continue to observe and elucidate the important cloud phenomena.—Ed.